

### **Abstract**

**A microchamber for culturing nerve cells which comprises cell-sized electrode arrays located on a transparent glass substrate, microchamber arrays of 10  $\mu\text{m}$  or more in thickness for aligning cells provided thereon, and a semipermeable membrane, which has such a pore size that the cells cannot pass therethrough and is optically transparent to focused beam, provided on the microchamber to coat it thereby blocking the leakage of the cells from the chamber. This microchamber is further provided with a unit of allowing the replacement of a solution in the solution replacing unit, wherein a culture liquor is circulated, on the upper face of the semipermeable membrane; a unit of continuously and optically monitoring changes in the conditions of the cells in the microchamber arrays; and a unit of continuously measuring potential changes in each nerve cell and a unit for combining the both units. To clarify the learning process of cells, changed in stimulus responses are measured over a long time while completely controlling the network system and preventing the invasion with bacteria, etc.**